

REMARKS

Claims 1-10 are now pending in the present application. Claims 1, 3 and 6 have been amended and claims 9 and 10 have been added. Claims 1, 3 and 6 are independent. Reconsideration of this application, as amended, is respectfully requested.

Rejection Under 35 U.S.C. § 103

Claims 1-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Vock et al., USPN 6,320, 173 in view of Yokota et al., USPN 5,905,530. This rejection is respectfully traversed.

The present invention is directed to a ball motion measuring apparatus. Independent claim 1 of the present invention recites a combination of elements including "a calculating section for carrying out a magnifying process on only a portion of an original image including a ball image, thereby calculating magnified image data" and "a display section for displaying a magnified image based on the magnified image data wherein the magnified image data is used to calculate ball motion."

With regard to independent claim 3 of the present invention, this claim recites a combination of elements including "a calculating section for correcting a coordinate error of only a ball image in the original image made by a distortion of an original image which is caused by a lens of the CCD camera, thereby calculating correction data, said correction data being used to calculate true coordinates of the ball image."

With regard to independent claim 6 of the present invention, this claim recites a combination of elements including "a calculating section for correcting a coordinate error of only a ball image in the original image made by a shift of a direction of the ball image from a direction of an optical axis of the CCD camera, thereby calculating correction data, said correction data being used to calculate true coordinates of the ball image."

With the above construction according to the present invention, a ball motion measuring apparatus can be obtained which can measure the motion of the ball with high precision. Applicants respectfully submit that the references relied on by the Examiner fail to teach or suggest the above aspects of the present invention and therefore cannot accomplish the advantages of the present invention.

Referring to the Vock et al. reference, this reference discloses a ball tracking system, which includes a CCD camera. The Examiner recognizes that Vock et al. fails to disclose calculating magnified image data as recited in independent claim 1 of the present invention and correction data from distortion caused by the lens of the CCD camera as recited in independent claim 3. However, the Examiner relies on the Yokota et al. reference to modify Vock et al. to arrive at the presently claimed invention. Applicants respectfully submit that the modification of Vock et al. in view of Yokota et al. as proposed by the Examiner is insufficient to arrive at the presently claimed invention. The Examiner's modification of Vock et al. will be further disclosed below.

With regard to independent claim 6, it appears that the Examiner has taken the position that Vock et al. discloses all of the elements of this claim without relying on the Yokota et al. reference, since page 3, lines 3-4 of the Examiner's Office Action indicate that Vock et al. teach "tracker initial calibration" at column 13, lines 50+. It is requested that the Examiner confirm whether the Examiner is modifying the Vock et al. reference to disclose independent claim 6 of the present invention, or if the Examiner is relying on the Vock et al. reference alone in order to reject claim 6. If the Examiner is relying on Vock et al. alone, it appears that the Examiner's rejection should be one of anticipation under 35 U.S.C. § 102 and not obviousness under 35 U.S.C. § 103.

In any event, Applicants respectfully submit that the tracker initial calibration described by Vock et al. is insufficient to disclose the calibrating section recited in independent claim 6.

As the Examiner will note, independent claim 6 has been amended to recite "a calculating section for correcting a coordinate error of only a ball image in the original image made by a shift of a direction of the ball image from a direction of an optical axis of the CCD camera, thereby calculating correction data, said correction data being used to calculate true coordinates of the ball image."

In Vock et al., the tracker initial calibration is used to determine the distance the ball has traveled. The initial calibration does not correct "a coordinate error of only a ball image in the original image made by a shift of a direction of the ball image from a direction of an

optical axis of the CCD camera” as recited in independent claim 6 of the present invention. Referring to FIG. 7 of Vock et al., the tracker uses the number of pixels of the ball at the position 176 and compares the number of pixels of the ball at various position along the track 180 in order to calculate the distance the ball has traveled. Since Vock et al. only calculates the distance the ball travels, Applicants submit that this disclosure in Vock et al. is insufficient to disclose that a “coordinate error” is being calculated. In addition, since the ball is traveling in the direction of the optical axis of the CCD camera, there is certainly no coordinate error calculated due to “a shift of a direction of the ball image from a direction of an optical axis of the CCD camera” as recited in independent claim 6 of the present invention. In view of this, Applicants respectfully submit that the Vock et al. reference either alone or in combination fails to disclose independent claim 6 of the present invention.

With regard to the Yokota et al. reference, this reference is not directed to a camera used for measuring ball motion. Accordingly, this reference fails to disclose calculating a coordinate error of a ball image and therefore fails to make up for the above deficiency of Vock et al. However, to the extent the Examiner believes that the Yokota et al. reference makes up for the deficiency of Vock et al., it is respectfully requested that the Examiner explain this position in the next Office Communication.

With specific regard to independent claims 1 and 3 and the Examiner’s reliance on the Yokota et al. reference, as the Examiner will note, independent claim 1 has been amended to recite “wherein the magnified image data is used to calculate ball motion.” In

Yokota et al., column 30, lines 15+ describe an image enlarging circuit, which enlarges "a specified area of an image." However, Yokota et al. only discloses an image pick up apparatus that includes a zoom feature. There is no indication in Yokota et al. that the magnified image data is used to calculate any type of parameter. Furthermore, Yokota et al. is not even directed to a camera for measuring ball motion. In view of this, Applicants submit that the combination of Vock et al. and Yokota et al. is insufficient to arrive at the present invention as recited in amended independent claim 1.

With regard to independent claim 3, the Examiner relies on Yokota et al. to modify Vock et al. to correct distortion of an image. However, as the Examiner will note, claim 3 (and claim 6) have been amended to include the recitation "said correction data being used to calculate true coordinates of the ball image." Since Yokota et al. fails to disclose calculating true coordinates of a ball image, Applicants submit that the combination of Vock et al. and Yokota et al. fails to arrive at the presently claimed invention. Accordingly, the combination of Vock et al. and Yokota et al. fail to render obvious the presently claimed invention as recited in independent claims 1 and 3.

With regard to dependent claims 2, 4, 5, 7 and 8, Applicants respectfully submit that these claims are allowable due to their respective dependence upon allowable independent claims 1, 3 and 6, as well as due to the additional recitations in these claims.

In view of above amendments and remarks, Applicants respectfully submit that claims 1-8 clearly define the present invention over the references relied on by the

Examiner. Accordingly, reconsideration and withdrawal of the Examiner's rejection under 35 U.S.C. § 103(a) are respectfully requested.

Additional Claims

Additional claims 9 and 10 have also been added for the Examiner's consideration. Applicants respectfully submit that these claims are allowable due to their dependence upon allowable independent claim 1, as well as due to the additional recitations in these claims.

Favorable consideration and allowance of additional claims 9 and 10 are respectfully requested.

CONCLUSION

Since the remaining references cited by the Examiner have not been utilized to reject the claims, but merely to show the state-of-the-art, no further comments are deemed necessary with respect thereto.

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.


It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Paul C. Lewis, Registration No. 43,368 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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